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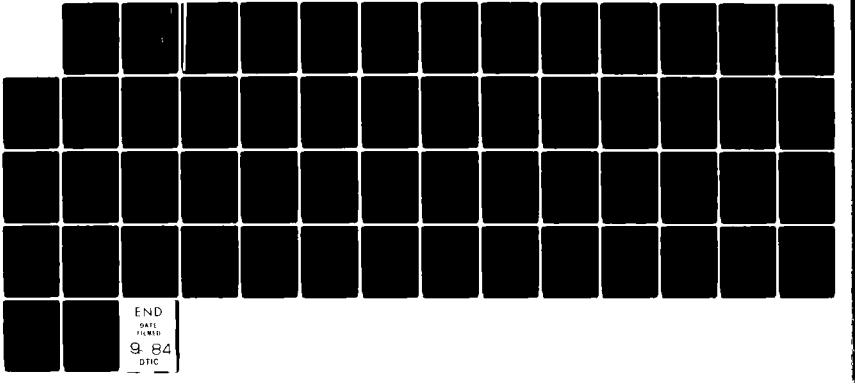

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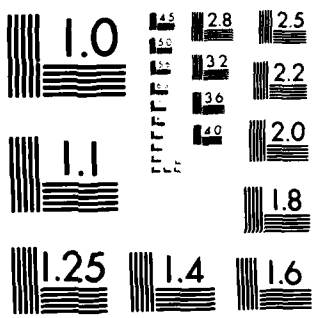

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LOCAL AUTOMATION MODEL: CONCEPTUAL DESIGN DOCUMENT

April 1983

Walter P. Hamilton, III
Dennis J. O'Connor
Richard W. Hartt

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This document contains a conceptual design for the Local Automation Model (LAM). The LAM will provide DoD Technical Libraries in the Shared Bibliographic Input Network a local automated information system to improve the management of DoD bibliographic information. The LAM will replace the existing manual and batch procedures by technical library personnel. The system will provide automated storage of local bibliographic files and access to both local files and the DTIC Technical Reports Data base. This conceptual design document

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provides a basis for review and approval of the design factors and processing concepts that will guide all subsequent system design and development efforts.

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SECTION 1. INTRODUCTION

1.1 PURPOSE OF THE CONCEPTUAL DESIGN DOCUMENT

This conceptual design document for the Local Automation Model (LAM) provides a basis for review and approval of the design factors and processing concepts that will guide all subsequent system design and development efforts. The document delineates the organizational environment -- in terms of organizational functions and processes -- to be addressed in an automated system design. Additionally, the document establishes a framework for investigating and developing processing alternatives for implementing the system concept and supports an initial assessment of system capabilities with respect to user requirements. The concepts presented here will be developed in greater detail as system development continues and will be further documented in a functional description and system/subsystem specification.

1.2 CONTENTS OF THE DOCUMENT

Principal emphasis in this document is placed on describing the capabilities required for a locally adaptable technical library automation model. Section 2 contains the relevant factors considered in the conceptual design. These include a statement of the problems faced by potential LAM users in the absence of adequate automation capabilities, general system objectives derived from sponsor and user interviews, and a summary of system user requirements.

Section 3 presents a brief description of the organizational functions and processes considered for automation support by a LAM. This presentation establishes a point of reference (for both the developer and the potential user) for discussing LAM capabilities, identifying subsystem interrelationships, and developing assessments of system implementation benefits,

priorities, and impacts. The proposed system components are presented and described, along with a discussion of the processing concepts pertaining to each component (subsystem). Preliminary hardware and software characteristics are included. Section 3 concludes with a discussion of preliminary data base characteristics.

Section 4 contains a list of critical research topics developed during preparation of the conceptual design. The topics represent areas critical to successful system design specification and implementation. They are highlighted as distinct research efforts to be addressed in the course of preparing the functional description, system/subsystem specification, and subsequent documents.

1.3 TERMS AND ABBREVIATIONS

The following acronyms are used in this document.

COM	Computer Output Microfilming
COSATI	Committee on Scientific and Technical Information
DBMS	Data Base Management System
DRIT	DTIC Retrieval and Indexing Terminology
DROLS	Defense RDT&E On-line System
DTIC	Defense Technical Information Center
ILL	Interlibrary Loan
LAM	Local Automation Model
RSAG	Resource Sharing Advisory Group
RTIS	Remote Terminal Input Subsystem
SBIN	Shared Bibliographic Input Network
SDI	Selective Dissemination of Information
TR	Technical Report

1.4 REFERENCES

The development of this document is authorized by LMI Task Order No. DL302 (MDA903-81-C-0166), "Local Automation Model," undertaken by the Logistics Management Institute as requested by the Defense Logistics Agency. The project is sponsored by the Defense Technical Information Center (DTIC) Information Research and Technology Division. The project is monitored by Mr. John Carney, Office of Information Systems, DTIC.

The following documents were referred to in the development of this report:

- LMI Task Order No. DL302, "Local Automation Model," Logistics Management Institute, 15 November 1982.

- "Department of Defense Automated Data Systems Documentation Standards," Standard 7935.1-S, 13 September 1977.

- "Guide to Library Automation," Barbara G. Toohill, The Mitre Corporation, McLean, Virginia, January 1980.

- "Downloading and Post-Processing of Bibliographic Information with the TIS Intelligent Gateway Computer," Isom Harrison, Jr., Viktor E. Hampel and Richard A. Kawin, Lawrence Livermore National Laboratory, September 1982.

- "Generalized Information Retrieval Language (GIRL II) User Guide," Headquarters, Defense Nuclear Agency, May 1974.

SECTION 2. FACTORS INFLUENCING THE CONCEPTUAL DESIGN

2.1 STATEMENT OF THE PROBLEM

The principal goal of the SBIN Program is to have participant libraries share bibliographic information, thus minimizing duplication of effort. For much of the information maintained by DoD technical libraries, the SBIN concept offers an effective tool for providing reference services. However, because all bibliographic data cannot be transmitted to DTIC, SBIN libraries must maintain dual systems and procedures: one for local files (usually manual or batch processed) and another for inputs to DTIC. There are several limitations and problems with this configuration which the LAM design must address. This section contains a discussion of these limitations.

One mission of SBIN libraries is to serve the professional staff of their organization, especially by responding to staff requests for bibliograpic information. The speed with which a library can respond to an inquiry is a primary indication of its effectiveness. With the existing manual (card catalog) and batch systems, responding quickly to inquiries is difficult. A manual search not only takes longer to complete but requires the library staff to devote more of their time to catalog searches and less to other library tasks.

Libraries using batch systems experience particular difficulties. Many are operated on computer equipment that is shared with non-library applications and maintained by a computer staff that must serve the needs of more than one user. Batch searches are frequently run overnight and are not responsive to patrons' needs. Since most libraries using an automated system have designed and developed it for internal use, efforts among libraries have been duplicated and procedures for entering, extracting and processing data have not been standardized. The existing batch systems also lack processing

features which SBIN participants require. For instance, many existing systems do not allow for identification and management of special collections within a library or for establishment of separate data bases for library requirements other than the traditional library functions, such as the Nuclear Test Personnel File maintained by the Defense Nuclear Agency Technical Library.

Another limitation of both manual and batch systems is the difficulty of performing a subject search thoroughly. For manual searches, a librarian must use the card catalog, going from drawer to drawer checking topics which might be relevant and extracting those citations. With batch systems, a librarian must list all relevant search subjects before the search is performed and no feedback on the accuracy of the search is received until the output is printed. Then, if a follow-up search is needed, another list of search subjects must be prepared, and again, the librarian waits for the request to be processed and the output to be printed. If an interactive system were available, searches could be performed in a "conversational" mode between librarian and computer until the appropriate references were identified.

Since DTIC files and local library files are not currently linked, a SBIN library is required to perform duplicate data input and retrieval. A local automation model would enable libraries to enter data once and transmit it to either DTIC, a local file or both, and to perform retrievals on either a DTIC file, local file, or both simultaneously.

In summary, existing library procedures and systems are cumbersome, time consuming, and inadequate. Librarians need improved automated support in order to do their job effectively.

2.2 GENERAL OBJECTIVE

The Local Automation Model will be designed to address the problems discussed in Section 2.1, thereby enhancing the capability of SBIN participants

to manage DoD and contractor bibliographic information effectively. This objective will be achieved by allowing users to:

- store and process bibliographic information on all library holdings including those not eligible for DROLS
- perform simultaneous searches of DTIC and local files
- accept and process inputs in machine-readable format
- access bibliographic data in a real-time interactive mode
- process installation-unique collections having special formats
- define, generate, and store custom output reports
- use a modular approach to implement the system, by implementing only the functions which a library may require, not a pre-ordained set of functions which everyone must accept
- process and transmit data in accordance with DoD security and ADP regulations.

2.3 USER REQUIREMENT -- SUMMARY

The basic requirements were developed/defined during the initial stages of conceptual design development. The first stage requirements were defined as:

- provide each library with a local automation model for its use in implementing automated library processes
- provide the local site with the ability to store and retrieve its own classified technical report information
- provide the ability to integrate local bibliographic data with the report information it submits to DTIC.

Using these basic requirements as a guideline, DTIC and the SBIN members were asked to formulate additional or supplemental requirements from which a requirements survey instrument could be formulated. The results are shown in Figure 2-1, "DTIC and SBIN Member Inputs: LAM Requirements." These requirements were further expanded using information obtained during interviews with select technical library managers and staff members.

FIGURE 2-1. DTIC AND SBIN MEMBER INPUTS:
LAM REQUIREMENTS

1. System locally-based to handle all materials including those not eligible for DROLS input (TS, Intelligence, Drafts, etc.).

2. Multilevel - inaccessible by DTIC or other sites subnet capability

3. DROLS compatible, using the same input and retrieval protocols as DROLS, with the following exceptions:

   Single keyboarding: automatically merge search results of parallel searches

   Enhance DROLS retrieval capabilities to include keyword access, proximity searching, ability to search by regrade/declassification date

   Enhance DROLS input capabilities to include prompted data entry.

4. Able to add new fields easily and decide which fields should be searchable at local site.

5. Pull DROLS record into own file and edit fields.

6. Software transportable to 2-3 mini/micro computers.

7. Real time interactive system; response time: 15 seconds for local system.

8. Capable of inventory control/circulation, distribution, Patron file maintenance; bar codes (light pen).

9. Capable of statistics - collection management.

10. Capable of designing output formats: order of fields, sort records, suppressing appearance of fields and producing books on COM catalogs.

11. Produce print image record from mini/micro; SDI program (links w/patron file).

The major LAM requirements which address the problems identified in Section 2.1 are described in Figure 2-2 "Local Automation Model." For instance, proximity searches are not available in the current manual or batch

FIGURE 2-2. LOCAL AUTOMATION MODEL

PROBLEM	REQUIREMENT
	Application Software Requirement
1. a. Local library systems (automated) are not capable of performing simultaneous key-words and proximity searches or entering data using DROLS protocol.	- Convert LAM query language syntax into DROLS query language syntax and vice versa *with a single command*.
b. Catalog data that are retrieved from DROLS must be batch processed or manually entered into the local system.	- Automatically merge parallel (DROLS/LAM) search results.
c. New catalog data must be processed twice, once for the local system and again for DROLS.	- Provide the capability to retrieve DROLS output, edit it and process it at LAM site.
	- *Software* must be capable of processing bibliographic machine-readable cataloging input/output.
	Application Software Requirement
2. Current local systems are not capable of announcing new acquisitions, i.e., users are not advised of new publications/relevant documents automatically.	- Link the Selective Dissemination of Information (SDI) software with the Patron file.
	Application Software Requirement
3. Most local automated library systems are unable to process multiple copies of documents without re-entering the entire document for each copy.	- Process citations for classified and unclassified documents (multiple copies), such as; technical reports, books, micro-film, microfiche, Vu-graph, etc.
	System Software Requirement
4. Current SBIR library systems (automated) cannot produce *ad hoc or standard reports* on-line, such as reports on documents due for special review or documents in special holdings.	- Provide or be compatible with an integrated-report-writer that: Permits ad hoc, on-line report *generation* Permits user to define and store report formats for later use Can be used by non-data processing oriented users, and Provides data manipulation, arithmetic operations, and formatting capabilities.
	Other System Requirements
5. Most SBIR special libraries share computer resources with other departments or agencies; library processing is *usually* assigned a low priority, which causes unacceptable delays.	- A locally-based system maintained and operated by the host-*site personnel*.
	- LAM computer personnel and local users must protect hardware from unauthorized use.
	- LAM computer hardware/software environment must adhere to DoD, Service, Agency or DTIC regulations for the installation, operation and maintenance of that *hardware/software* environment.

FIGURE 2-2 (Continued)
System Software Requirement

6.	Most automated systems currently in use were designated to process data for a particular library. These designs do not provide for compatibility with other equipment or other library needs.	- LAM software should be transportable to two or three brands of micro/minicomputers.
		System Software Requirement
7.	a. Most automated local library systems are not designed to process and protect sensitive, priority, copyright and/or classified data.	- LAM must have the capability to communicate with specific branch libraries and DTIC.
	b. There is little ability to communicate (classified or unclassified) data between libraries using electronic data processing and communication technology.	- LAM must provide for a multi-user environment which supports interactive on-line and batch processing (classified and unclassified). - LAM must be capable of processing documents that are included in the Privacy Act. - LAM must provide update software and procedures that provide automatic data validation according to user-specified criteria, record lock-out to prevent simultaneous update action from multiple users, and an audit trail. - Security protection must be provided at the following levels: Terminal Application system (to data element level) User account Communication interfaces
		Other System Requirement
		- LAM must have access to and be compatible with communications software and hardware that is capable of transmitting and protecting data.
		Application Software Requirement
8.	Most SBIR library systems do not provide adequate statistical data that are needed to manage a library in an effective manner.	- Software must be capable of producing standard operational reports such as Inventory, Weeding, Circulation, Downgrade, SDI, and patron Frequency of Use shelf lists.
		System Software Requirement
9.	Most libraries that have automated systems do not have a common data base that can be used by all authorized users. Departments within agencies have developed their own automated files to catalog information concerning their documents.	- Data base must be structured such that all distinct collections within a library can be identified and searched.
		System Software Requirement
10.	In most cases, current systems were designed to operate on a specific brand of equipment, which does not lend	- LAM must be designed and implemented as a modular system accommodating hardware/software updates or

FIGURE 2-2 (Continued)

11. Due to heavy workload and limited resources, local library personnel are unable to input all pertinent information into the data base, i.e., citations external to agency, abstracts, subject terms, etc.	Application Software Requirement - Software must be capable of processing the traditional library functions: acquisitions, cataloging, circulation, and distribution - Software must be modular in design to allow a phased approach to the LAM implementation. - File maintenance system that provides a hard-copy/COM print of the data base to minimize the effects of interrupted service.
12. Manual production of catalog cards and receipts is time consuming and inefficient.	Application Software Requirement - Software must have the capability to generate catalogs (hardcopy, i.e., microfiche, paper) and multiple copies of patron receipts, etc., automatically upon request.
13. Inability to define/redefine data elements or structures to enhance current processing procedures.	System Software Requirement - Ability to add new data elements, define/redefine data elements or add new data structures to the data base without complete re-load or reorganization of the entire data base.
14. Most local library functions that are automated are processed in a batch mode which is not time sensitive to user needs.	System Software Requirement - Real time interactive system that processes an average search command within 7.5 seconds and an average non-search command within 2 or 3 seconds.
15. Most local libraries are unable to sort holdings by collection.	System Software Requirement - LAM must contain or be compatible with system utilities (i.e., sort, merge, internal clock and calendar).
16. Most local libraries do not have the capability to perform free text searches.	Application Software Requirement - LAM must contain a query language which will: Use English-like syntax (minimal training) Allow Boolean combinations of search arguments Be "User-friendly"; comprehensive diagnostic messages Allow search arguments to contain a range of values.
17. Local libraries cannot transfer data that are contained on word processing equipment to current local library systems.	System Software Requirement - LAM software/hardware must be capable of accepting data that are contained on magnetic files. If data cannot be transferred, LAM must contain or be compatible with commercially supplied word processing package.

FIGURE 2-2 (Continued)

18. These requirements are presented not as problems but as requirements that should be considered in developing a data base system.

Other System Requirement

- Procedural language interface to allow data base access from application programs written in a high-level language such as COBOL, "C", FORTRAIN or PL/1.
- Hardware/Software selection should consider expected growth projections.
- LAN software must possess the capability of restarting program execution, in case of intermittent failure.
- File maintenance system providing automatic backup and restoration of software and data files in case of damage to the data base.
- Electronic mail capable of establishing a two-way communications path. Electronic mail software allows the LAN user to send and receive correspondence from other users of the LAN.
- LAN software should be capable of interacting with users possessing different level of LAN query-language/report writer skills.

systems, but are common in on-line systems. To support proximity searches the LAM must fill the following requirements:

- Data base must be structured such that all distinct collections within a library can be identified and searched
- Real time interactive system that processes an average search command within 7.5 seconds and an average non-search command within 2 or 3 seconds
- LAM must contain a query language which will:
  - -- use English-like syntax (minimal training)
  - -- allow boolean combinations of search arguments
  - -- be "user friendly" (provide comprehensive diagnostic messages)
  - -- allow search arguments to contain a range of values.

Some problems, such as the existing delays and current low priority of library processes imply inadequacy in the hardware environment. Thus, the requirements stemming from items 5 and 18 in Figure 2-2 are as follows:

- A locally-based system maintained and operated by the host-site personnel
- LAM computer software/hardware environment must adhere to DoD, Service, security agency or DTIC regulations for the installation, operation and maintenance of that software/hardware environment
- Hardware/software selection should consider expected growth projections.

Another problem to highlight is library managers do not have the capability to transfer data between selected libraries using computer-to-computer communications. The requirements defined to eliminate this inconvenience are:

- LAM must have the capability to communicate with specific branch libraries and DTIC
- LAM must provide for a multi-user environment which supports interactive on-line and batch processing
- Security protection must be provided at the following levels:
  - -- Terminal
  - -- Application system
  - -- User account
  - -- Communication interfaces.

SECTION 3. SYSTEM CONCEPT

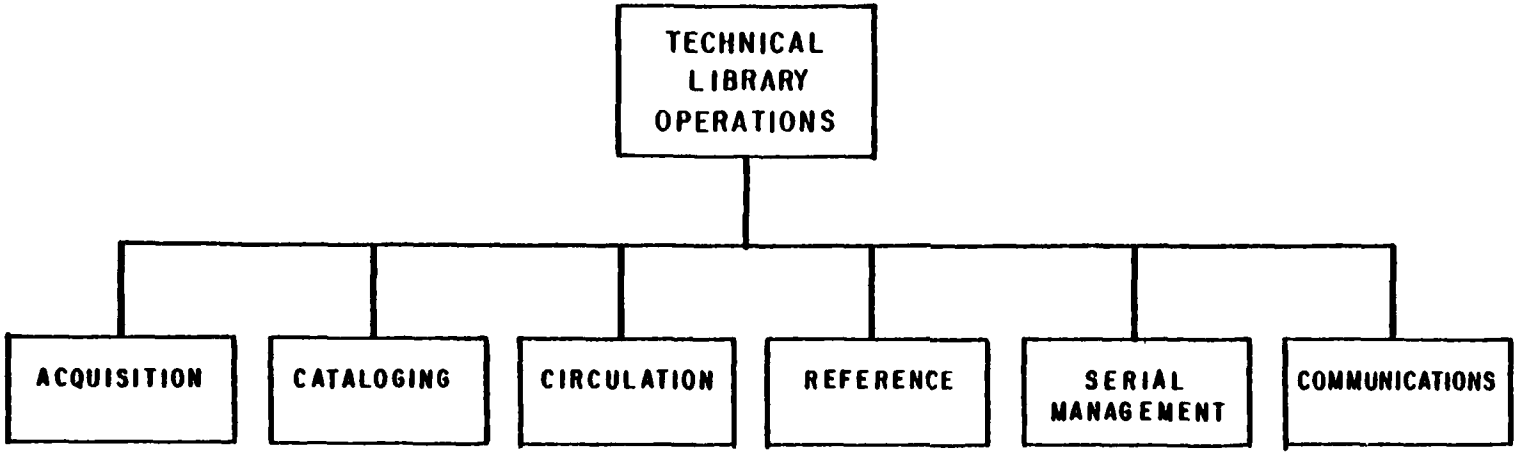
3.1 THE ENVIRONMENT -- TECHNICAL LIBRARY FUNCTIONS AND PROCESSES

Initial efforts in developing a conceptual design for the Local Automation Model involved the delineation of the functions and processes performed by a technical library. This delineation aided in establishing a framework for information requirements determination and definition, and provided a means of organizing the modules or subsystems of the LAM. Establishing an understanding of the organizational environment (by defining the functions and processes performed) in conjunction with an information system development effort offers three distinct benefits:

- permits creation of a framework for building a fully integrated library information system designed from the perspective of the information needs of the user community
- provides a guide for assessing current library systems' capabilities and development efforts
- forms a comprehensive road map for planning library system development and implementation (modular, yet integrated system/subsystem implementation).

The potential LAM user community (chiefly Shared Bibliographic Input Network (SBIN) members) represents a spectrum of library information system needs and capabilities (current and projected). The viability and acceptability of a LAM rests on the capability of each potential user library to select and successfully implement required modules (subsystems) within a variety of existing and projected hardware and software environments. The ability to select LAM modules and potentially expand system capabilities over time (while ensuring total system integrity and compatability) is enhanced by delineating information requirements in relationship to organizational functions and processes. Figure 3-1 portrays the functions and processes involved in operating a technical library.

FIGURE 3-1 TECHNICAL LIBRARY FUNCTIONS AND PROCESSES THE LOCAL AUTOMATION MODEL (LAM) ENVIRONMENT



PROCESSES

FUNCTIONS

BUDGET	DEVELOP BIBLIOGRAPHIC RECORD	PATRON REGISTRATION	SOURCE DIRECTORIES	MONITOR SUBSCRIPTIONS	DTIC
ACCOUNTING	DOCUMENT BIBLIOGRAPHIC RECORD	PATRON DIRECTORY	PROVIDE INDEXES	UPDATE/PREPARE BIBLIOGRAPHS	RETRIEVALS
RECEIVING	UPDATE CATALOG	CHECK-IN	PROVIDE ABSTRACTS	UPDATE	CATALOGING
SOURCES	MAINTAIN CATALOG	CHECK-OUT	OPERATE ILL	BINDING OPERATIONS	OTHER LIBRARIES
PRELIMINARY BIBLIOGRAPHIC RECORD		INVENTORY MANAGEMENT			
		CIRCULATION STATISTICS			

Section 3.2 describes the functions and processes shown in Figure 3-1. Each function is treated as a LAM module or subsystem within the conceptual design. Section 3.3 describes the processes considered for automation within the LAM and presents the automation concept for each process. Section 3.4 discusses the preliminary data base characteristics. This includes its structure, integrity, data independence and growth projections. Section 3.5 contains the preliminary hardware and software characteristics to be further specified as the processing concepts are developed in greater detail in the functional description. In developing the information architecture for the LAM, it is apparent that a central data file (or group of files depending on the degree of subsystem implementation) must be created and maintained to support many of the automated precesses. For this reason, early emphasis has been placed in the conceptual design development on a data base structure for the LAM.

3.2 SYSTEM COMPONENTS

Libraries have traditionally performed the functions of acquisition, cataloging, circulation, reference and serials control. Since it is important to examine the component processes within these functions before considering the need for automation, a brief description of each function is presented in this section.

Acquisitions

The library acquisition function includes all work performed after a library item is requested until the item is given to the cataloging department. This process can be broken down into three processes: accounting, work-flow control, and preliminary bibliographic development. In the accounting process, the acquisitions department records and tracks fiscal data on items ordered. Within the work-flow process, the acquisition department monitors the flow of ordered items and the status of each order in the system.

For the bibliographic development process, the acquisition department locates records that describe requested items and from these data creates a temporary record for the automated files.

Cataloging

To create a bibliographic description, a cataloger either performs original cataloging or relies on cataloging records from another service, such as the Library of Congress. Regardless of the source, the cataloger strives for accuracy and completeness of the description, correctness and consistency of the choice of entries and headings, and the appropriateness of the classification or call number. In deciding on descriptions, entries, headings and classification numbers, the cataloger can make use of the national cataloging code (AACR2), the Department of Defense subject categories (COSATI), classification schedules (Library of Congress or Dewey Decimal), and the authority files and procedures of the individual library. After an item has passed through cataloging and into the collection, the ability to access and retrieve it depends on the entries and the classification number selected for that item by the cataloger. Catalogers also maintain local files, such as authority files for subject keywords, headings, and shelf lists, as aids to accuracy and consistency.

Circulation

Circulation control involves two distinct concerns: inventory control and marketing. From the standpoint of inventory control, circulation involves tracking the status of an item, including the name of the patron who checked it out, how long the book will be checked out, where the other copies are, etc. Statistics are maintained on the use of items so that additional copies of heavily used items can be ordered. From the marketing viewpoint, circulation involves quick, efficient service to the patron. This includes

the ability to locate an item when it is requested and determine its availability if on loan. When a circulation system, either manual or automated, is efficient and well-run, the benefit to patrons is that accurate records of charges can be kept and patrons can be notified of the availability of items on reserve. Among the benefits of automated circulation are improved control of inventory, readily available circulation statistics, and a potential reduction in manually maintained patron/inventory files.

Reference

The reference function is intended to provide a patron with bibliographic tools appropriate to his field of inquiry. Reference functions may be dependent both on files created and maintained within the library and on files external to the library. A reference librarian makes use of the bibliographic records stored in the library's catalog without routinely augmenting or revising them. Reference can often include the utilization of files and other bibligraphic tools (such as catalog indexes and guides) external to the library catalog. For instance, many libraries depend upon on-line search systems such as DIALOG[1] and ORBIT[2] for additional bibliographic citations. However, within the framework of designing the LAM, reference is considered to be the process of performing catalog searches (by title, author, subject heading or other descriptor) for an individual item or class of items which are needed by a patron or librarian. In libraries with a manual system, this involves a card catalog search; for libraries with automated systems it entails a file query. In both cases, the speed and accuracy with which a search can be performed and provided to the requester is the key factor in measuring a library's effectiveness in this function.

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[1]DIALOG is a trademark of LMSC, Inc.

[2]ORBIT is a trademark of Systems Development Corporation.

Serials Control

Serials control involves the management of all periodical publications in a library's collection. These include popular magazines, scientific journals, newspapers, and conference proceedings. Serials are important in all libraries, but especially so in research or special libraries where serials are often used more than monographs. Serials disseminate current information more efficiently and are, therefore, in high demand. The serials control function consists of a number of processes: ordering and renewing subscriptions, writing and updating bibliographic records, establishing a catalog, checking in new issues, handling all tasks associated with binding of back issues, tabulating subscription data for accounting, and maintaining statistics. Serials control can be a time-consuming process, especially in a library with many subscriptions. A librarian needs to log in and circulate each copy as well as catalog new titles and labelling individual issues. Serials are different from monographs in that serials have more corporate author entries, multiple title entries, and possibly duplicate titles. Frequent title changes increase the workload and complexity of this function.

3.3. PROCESSING CONCEPTS

A decade ago, very little automation had been applied to libraries and much of what they had was designed for a specific library. Now many systems and services for a variety of library functions are available from vendors, networks, and other libraries.

Automation has a fundamental impact on the way a library is organized. The traditional boundaries between functions begin to dissolve when data are used by more than one function. Data are shared, for instance, in libraries where bibliographic records are organized in a data base and used in various functions. Consequently, systems for cataloging and circulation are no longer distinct. Instead, there is a data base of bibliographic records on which

many operations are performed. Despite this blurring of functional boundaries, there are distinct elements within each function which can be automated. This section highlights the potential for automation in each of the five major functions.

Acquisitions

As stated in the previous section, acquisitions can be seen as comprising three processes: accounting, work-flow control, and preliminary bibliographic development. Automation of the accounting process has been emphasized in automated acquisition systems for two reasons: first, it is relatively simple to achieve and second, the requirement for fiscal accountability is as important in libraries as in other organizations. A computerized acquisitions system can support a library in maintaining accurate records of expenditures, accounts, invoices and bills paid. Producing orders, claims, cancellations and statistical reports can be time consuming and require the use of many manually maintained files. Having an automated system to produce these forms, notices, and reports will save library staff time.

By automating the work-flow process, an item can be controlled as it is processed. Status reports of an item in the acquisition process can be generated automatically. Exception reporting on items not received on time can be produced to initiate re-orders, claims, or cancellations. Statistical reports, which indicate the number of items at each step in the process (for instance, on-order, received, in-process), can assist the library staff in tracking and distributing the workload.

Automating the preliminary bibliographic development process can yield a number of capabilities and benefits. Most importantly, it creates bibliographic records for transfer to other files and for use as input to the cataloging department. It produces cataloging materials when an item is

received. It can quickly inform a searcher whether an item is on order or in process and can initiate bibliographic control when library materials are first requested. It is recommended that automation of the acquisition function be given low priority.

Cataloging

The process of cataloging is fundamentally judgmental. A cataloger must make certain decisions according to standard rules and codes while observing local conventions in developing a bibliographic record. We do not recommend attempting to automate the judgmental process of cataloging, but rather the maintenance, processing, exchange, and output of the results of that process -- the bibliographic record. By accessing a catalog network, libraries can obtain bibliographic records which have already been prepared in accordance with standard cataloging procedures. A cataloger can then tailor that record to conform to local library conventions. Trends in compiling bibliographic data bases, developing cataloging networks, and expanding participation of libraries in these endeavors have exceeded the automation projects in other library functions. This level of automated cataloging is recommended for the LAM.

Circulation

Automating the circulation function can fulfill the need for better control of materials and for improved service to patrons. The requirements for automated circulation can vary from one type of library to another. For example, the requirement for automatic calculation of overdue fines and the capability to terminate the borrowing privileges of a patron who has exceeded the overdue fine limits are more appropriate for public libraries than for technical libraries. A major requirement for technical libraries is the ability to identify all materials checked out to an individual patron. This enables the library to request the return of each item, by title, at the time

the patron terminates employment at the institution. Another requirement of technical libraries is the ability to locate a particular item that is checked out if it is urgently needed by another patron. An automated circulation capability would satisfy both of these requirements and is recommended for incorporation in the LAM.

Reference

Automated reference can be interpreted to include the use of both the library's catalog and other bibliographic tools, such as abstracting services, indexing services, and tools which help a user locate services. Because the use of external bibliographic tools other than DTIC does not directly impact the design of the LAM, the reference function here is considered to include only the processes that involve the accession and manipulation of LAM and DTIC files. The most frequent use of the catalog files in SBIN libraries involves responding to a patron's request for a particular document. In response, a library staff member would search the automated file for the item and determine whether it was in the library's collection; if so, was it checked out, when was it checked out and when is it due to be returned. Given the importance of responding to patrons promptly (which, in some instances, requires a librarian to perform a catalog search while the patron is waiting on the phone), automated reference files with on-line search capabilities would be extremely useful. This function is seen as the primary function for automation within the LAM and is recommended.

Serials Control

As stated previously, serials control can be a complex process. For each periodical received, a librarian must check it in, distribute it, catalog new titles and label individual issues, as well as claim missing issues, return damaged issues and renew subscriptions. Because of the nature and

extent of record-keeping problems that serials present, fewer automated options presently exist for serials than for the other major functions. As recently as 1980, the only operational serials control systems were those designed in-house for a particular library. No turn-key systems were operating. Due to the overriding need for automation in the reference, cataloging and circulation functions and the lack of a stated need for automating this function, it is recommended that automation of serials control be given a low priority in the design of the LAM.

3.4 DATA BASE DESIGN CHARACTERISTICS

A data base is a collection of logical files containing interrelated, but nonredundant data that can be accessed by one or more application or software programs. Constructing a data base that is responsive to an organization's needs is a formidable task, primarily because of the number of interrelated variables. The DBMS approach to a LAM data base should facilitate data sharing, data independence, flexible data structure, security, data/database integrity, and database growth.

- Data Sharing: The goal is to enable library application/functions to share an integrated LAM data base containing all data needed, eliminating as much as possible the occurrences of redundancy.

- Data Independence: The goal is for program/data independence. It is desirable to separate programs from the data they process in order that changes in data will have minimum effect on the program that processes the data.

- Flexible Data Structure: A data base should have the ability for any part to be accessed on the basis of an access key(s) and logical qualifications. Its effectiveness can only be realized through this characteristic. These interfaces should include ad hoc user languages, programming interfaces, and on-line multi-user access.

- Security: Proper mechanisms must assign, control, and remove the rights of access (read, insert, delete, and modify) of any data elements or defined subsets of the data base. As the amount of shared data increases, the task of insuring data security increases.

- Data/Data Base Integrity: When the data resources of an organization are being managed by data base technology, facilities should be provided to protect the contents of LAM data base. The main task is the

coordination of data accessing by different applications and maintain a high degree of consistency and correctness of data.

- Data Base Growth: One of the design features or requirements of a LAM is its ability to respond to growth projections/ requirements. The major factor to be considered is the amount of on-line disk storage that is needed to hold the bibliographic cititations. Disk storage size is measured by the number of characters that it may contain. When establishing initial storage requirements, the total number of characters, and increases in the number of bibliographies must be included.

- Data Element Dictionary: A dictionary used to specify the way in which data are stored and managed in the LAM data base environment. Because the physical organization and referencing of data from the data base removed from the application program and are instead specified through the data definition section of the data base, that data can be physically restructured and reorganized for the most efficient use without requiring substantial modification of programs that access the LAM data base.

As currently envisioned, the basic data elements that will be used are the data elements contained in the DTIC Technical Report (TR) Bibliographic Data Base. These data elements are essential to sharing and cataloging of bibliographic data between a LAM, DTIC and SBIN members. Additional data elements that are needed by the local libraries will be defined. Data elements that are currently in automated or manual systems should be carefully analyzed prior to entry into the LAM data base.

3.5 PRELIMINARY SOFTWARE AND HARDWARE CHARACTERISTICS

The minimun equipment required for the successful LAM development and operation is identified in this section. The equipment defined should be locally-based and maintained by the library personnel.

LAM Software

The development and operation of the LAM will require support software with the general characteristics described in this section. Special application software (such as special reports, special local processing, and database loads) that may be desired by a given SBIN library is not described. However, development of such application software will require the following support software.

An operating system must allow for:

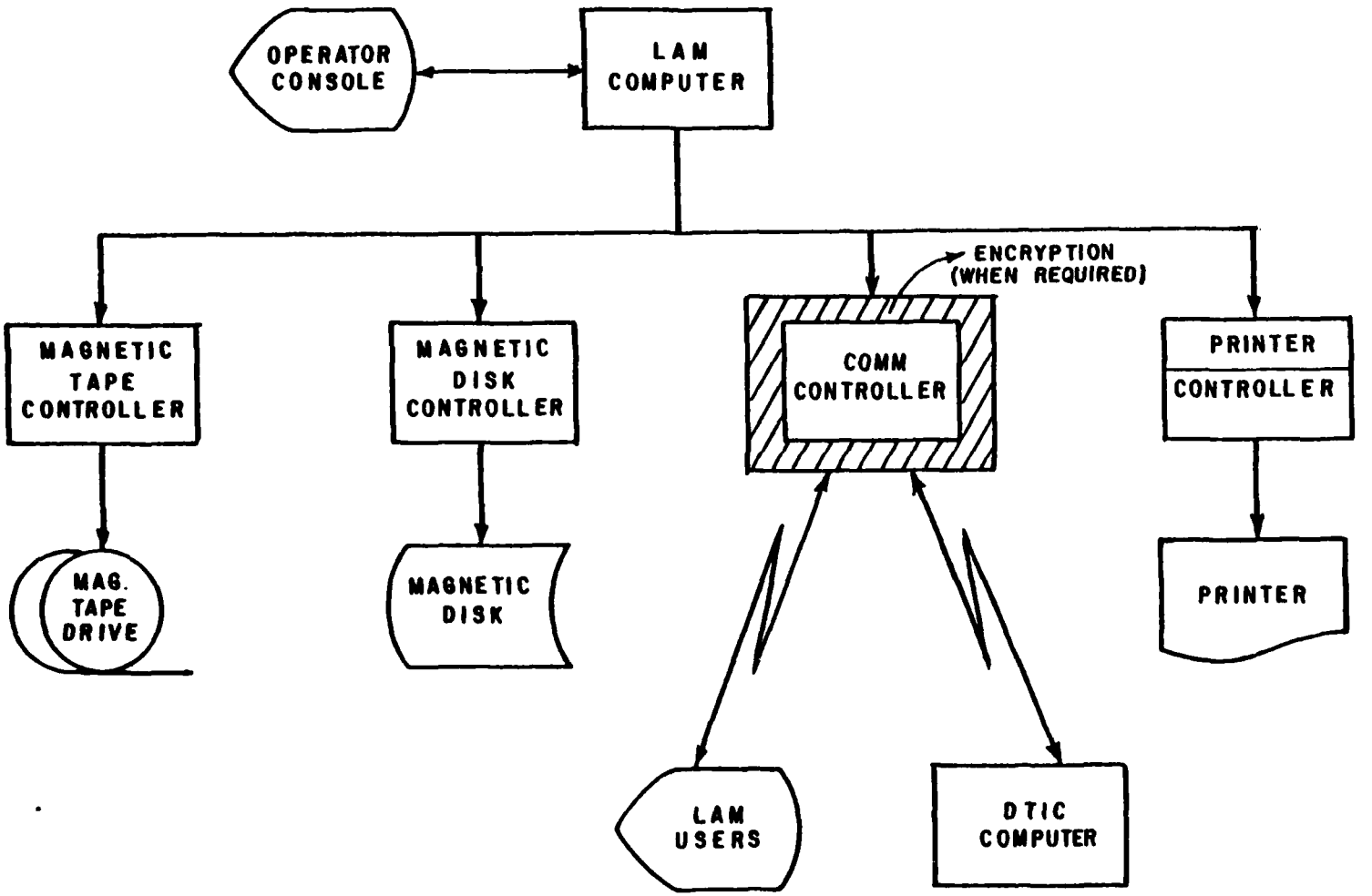
- simultaneous access to the computer for multiple users
- telecommunications to support input and output of classified and unclassified data supplied by the users
- system utilities to provide for such functions as file backup, merge, sort and standardized machine-readable input
- provision for or compatibility with an integrated report writer.

LAM Hardware

The following, along with Figure 3-2, describes the LAM hardware configuration and characteristics:

- A central processor, an operator console, an I/O control unit and I/O channels adequate to service the I/O devices described below, and a communications processor able to support classified telecommunications and several simultaneous users
- A disk controller with a disk drive. On-line disk storage must be able to support LAM data base files
- A magnetic disk drive and a magnetic tape drive to be used to accommodate multiple sources of input and create a LAM back-up file
- A line printer and controller capable of producing LAM printed output
- A modem/encryption device capable of transmitting classified data
- A terminal controller capable of on-line access to and from this host computer via CRT terminals.

FIGURE 3-2. LAM EQUIPMENT ENVIRONMENT



3.6 INTERLIBRARY COMMUNICATIONS

Library managers need an efficient way to transmit bibliographic data between branch libraries and DTIC. Currently many librarians use terminals to interface with external computer systems. This method of communicating has become more complex (less efficient) since the number of different external systems has increased. Usually, each system requires its own set of procedures, languages and sometimes hardware, and retrieved data is lost unless off-line printing is available. Library personnel are faced with piles of printouts containing redundant information in different formats from different systems. Manual reviewing, formatting, and further processing is required. New technologies have been developed to facilitate computer-to-computer interface. Through the use of these technologies the LAM will provide the library manager with the ability to:

- support simultaneous searches if desired, of DTIC and local files using a common communications protocol
- download bibliographic citation obtained from local and/or DTIC data base(s)
- merge the results obtained from individual or simultaneous queries
- retain search results for later use, and
- support cataloging of bibliographic data at the local level and DTIC.

The benefits derived from a LAM with these capabilities are:

- contains a built-in emulator to automatically make the necessary connections between DTIC and/or another LAM library
- requires one search argument to be entered when querying DTIC and the local data base
- reduces the number of user-specific languages that library personnel must learn, thus reducing costs and increasing efficiency, and
- offers the LAM library manager a powerful cost-effective method of repackaging retrieved information and the delivery of more relevant product.

3.7 INPUTS TO A LAM DATA BASE

Inputs into the LAM data base may take different forms. One method is entering data at the initial start-up (called file conversion) and another is entering data on a normal day-to-day basis.

a. Initial File Conversion: Implementation of an automated system requires that certain files be converted to a machine-readable form. Each library function contains information that must be converted. Serial, catalog, patron and other library files (holdings) must be converted. This is true for manual or automated files. File conversion is a tedious and laborious task that often takes longer and costs more than anticipated. File conversion will be considered in determining the resource requirements and developing specifications for the LAM.

b. Daily Entry of Data into a LAM: In any automated or manual system data are entered into the system daily. Input may take the form of machine-readable sources from commercial or government vendors: items received from DoD agencies, DoD contractors and/or commercial publishers. In any event, provisions for entering data into a LAM efficiently is clearly an important requirement.

3.8 SCREEN FORMATS

The actual screen formats that will be used to interface with those of the LAM user have not been defined. However, these formats should possess certain basic features and concepts. One of the most demanding features in developing the screen formats is that the formats must be both easy to use and sophisticated enough not to bore the frequent user.

Realizing the divergence of users' talents, software must be provided to present the user with two levels of communications: first a formatted screen where the user may simply fill-in the blanks, and second, a screen containing

natural language statements which allows the experienced user to interact directly with the system. Once the basic rules of this natural language are learned the user can freely communicate with the LAM. Appendix A shows samples of screen formats.

The flexibility of communicating with the LAM data base is a function of the LAM software. The selection/development of software is directly related to the capabilities that will be designed into the screen formats.

3.9 OUTPUTS FROM A LAM DATA BASE

The output reports generated from a LAM will show the library managers the status of the various library functions (i.e., cataloging, reference, and acquisitioning) and their corresponding statistical data. These reports will be designed into the system prior to initial startup. Additional reports may be defined and incorporated into the system using the special reporting feature within the report-writer module.

Appendix B contains LAM output report layout explanation sheets and samples suggesting the categories of information LAM users may find useful. Details on the substance of actual standard reports will be described in the functional description and later design stages of system development.

SECTION 4. PLANNED DEVELOPMENT EFFORTS

This section highlights the research topics identified as critical to further development and implementation of the LAM. Related to both the system operating environment (organizational) and the processing concepts presented in Section 3, these research topics aid in focusing subsequent development effort and support a comprehensive expansion of the LAM conceptual design. Results of analysis relating to each research topic will be presented in subsequent documentation (functional description and/or system/subsystem specification).

4.1 REQUIREMENTS VERIFICATION AND REFINEMENT

Requirements verification involves matching stated user requirements and other system objectives with the processing components of the LAM architecture. Each user requirement will be classified as part of a LAM subsystem/module and further matched to an automated processing capability within the subsystem. A matrix will be developed depicting the relationship between each potential user (library) and the LAM subsystems. Each potential user will be further characterized by the volume and types of transactions likely to be associated with automation of a required process. Process inputs and outputs -- both format and content -- will be specified. Accomplishment of this step will be the basis for developing hardware and software specifications suitable for formulating system configuration alternatives.

4.2 DATA BASE AND DATA BASE MANAGEMENT SYSTEM (DBMS) SPECIFICATION

In formulating the conceptual design for the LAM, it became apparent that a potentially key capability of the model was the local creation and maintenance of a central file or group of files. The ability to create or update

local files rapidly and simply and, alternatively, to search and read files, can be enhanced through use of a data base management system (DBMS). Several commercial software products exist which may be of use in implementing the LAM. To permit evaluation and selection of a fully capable DBMS, data base and derivative DBMS characteristics will be developed based on the automated processing capabilities selected.

4.3 HARDWARE SPECIFICATION

The hardware profile developed for the LAM will be based on LAM processing capabilities, data base characteristics, and user transaction volume. Alternative configurations will be investigated and compared with the hardware profile. Emphasis will be placed on identifying two or more alternative configurations so that individual libraries will not be significantly constrained in selecting an implementation method.

4.4 TELEPROCESSING AND NETWORKING ALTERNATIVES

Implementation of the reference subsystem will require use of a teleprocessing capability to access remote (DTIC and others) bibliographic sources. Additionally, local operation of the LAM may require the use of a teleprocessing network. User requirements for classified processing capabilities significantly influence network design and implementation. Critical components of classified processing networks have historically been difficult to obtain on short notice (less than one year). Teleprocessing and networking capabilities are strongly tied to the operating characteristics and capabilities of the host processor and accompanying system software. Teleprocessing and network characteristics will be developed in conjunction with other system characteristics and specifications, ensuring component compatibility and facilitating development of acquisition plans for critical components.

4.5 ECONOMIC ANALYSIS -- LIFE CYCLE COST ESTIMATES

As currently planned, each user library will be responsible for funding local implementation of the LAM. To assess the comparative cost of implementation alternatives, it is essential that life cycle cost estimates be developed reflecting the spectrum of automation capabilities available from the LAM. With cost estimates developed in this manner, user libraries can plan and formulate implementation and operation budgets consistent with the subsystem/module capabilities required. Based on the software, hardware, and telecommunications characteristics derived from the user requirements, technical cost estimates will be developed for each LAM subsystem and provided to potential users in the system documentation.

4.6 IMPLEMENTATION METHODS AND PLAN

Successful, timely application of LAM capabilities will require that each candidate library have an implementation plan consistent with the capabilities selected for implementation. Because of the broad spectrum of user requirements and diverse operating environments, it may not be feasible to develop a single implementation plan applicable to all potential users. However, it is likely that potential users can benefit from the delineation of implementation methods keyed to specific LAM capabilities. To the maximum extent possible, hardware and software characteristics and specifications will be developed in relationship to LAM capabilities. Such an approach enforces the concept of modular implementation and permits implementation planning by module. Other generally applicable implementation topics, such as system operation and maintenance requirements, user and operator training requirements, and potential organizational impacts, will be investigated and presented in subsequent development documents to aid in implementation planning by user libraries.

APPENDIX A

LOCAL AUTOMATION MODEL

SAMPLE SCREEN FORMATS

This appendix contains examples of screen formats designed to illustrate the levels of interaction with the LAM. Figure A-1 depicts how the novice might interact with the formats to guide the user. Directions for completing each screen format are given on each screen. Figure A-2, Sample Natural Language, illustrates how an experienced user might interface with the LAM.

These screen formats are preliminary in nature and are presented to illustrate the levels of user interface. The actual screen format design and query language commands are dependent on the selection of LAM software and hardware.

FIGURE A-1. FORMATTED LAM SCREENS

WELCOME TO

DEFENSE NUCLEAR AGENCY

LIBRARY SYSTEM

CHOOSE THE FUNCTION YOU WISH TO PERFORM

1. REFERENCE/CATALOG SEARCH
2. CIRCULATION
3. CATALOGING
4. REPORTS (STATISTICS, INDEXES)
5. HELP

ENTER THE DESIRED NUMBER AND DEPRESS THE TRANSMIT (RETURN OR ENTER) KEY

1*

DEFENSE NUCLEAR AGENCY

REFERENCE SUBSYSTEM

SELECT THE DATA BASE YOU DESIRE TO SEARCH

1. DTIC
2. LOCAL (DNA)
3. BOTH

ENTER THE DESIRED NUMBER AND DEPRESS THE TRANSMIT (RETURN OR ENTER) KEY

3

*USER RESPONSES ARE UNDERLINED.

FIGURE A-1. FORMATTED LAM SCREEN (CONTINUED)

SELECT THE TYPE OF SEARCH YOU WISH TO PERFORM

1. TITLE
2. AUTHOR
3. SUBJECT

ENTER THE DESIRED NUMBER AND DEPRESS TRANSMIT

2

DNA/DTIC CATALOG SEARCH BY AUTHOR

ENTER THE AUTHOR'S NAME AND DEPRESS TRANSMIT

LAST NAME: HAMILTON

FIRST NAME: DENNIS

MIDDLE INITIAL: E

TITLE(S)	AUTHOR
3	HAMILTON, DENNIS E.

DEPRESS TRANSMIT (RETURN OR ENTER) TO RETRIEVE DATA

AUTHOR: HAMILTON, DENNIS E.

ITEM	DATE	TITLE	ACCESSION #
1	1976	ANCIENT WASHINGTON; 2000 YEARS OF COMPUTER EXCELLENCE	DTL-1234578
2	1983	WASHINGTON D.C.; DEVELOPMENT OF THE SUPER DUPER THINKING COMPUTER	DTL-34567
3	1984	WALKING, TALKING, THINKING COMPUTERS OF THE FUTURE	ADB65327

STOP

FIGURE A-1. FORMATTED LAM SCREEN (CONTINUED)

TO SEE FULL REFERENCE INFORMATION ENTER ITEM NUMBER AND DEPRESS TRANSMIT (RETURN OR ENTER)

1

DTL-1234578 REPORT: UNCLASSIFIED

TML-146327

FUTURE HORIZON TECHNOLOGY, INC. MCLEAN, VA

ANCIENT WASHINGTON; 200 YEARS OF COMPUTER EXCELLENCE,

BOOK. 84-01-01. 432P. (DNA-5327A)

CONT-DNA-021-83-D-0123

SUBTASK-DNA-X123XA67B3

CIRCULATION INFO:

COPY # 23 OK
COPY # 23A REFERENCE
COPY # 14 CHECKED OUT

ENTER 1 FOR ADDITIONAL SEARCH; DEPRESS THE TRANSMIT (RETURN OR ENTER) KEY

ENTER 2 TO RETURN TO SELECT NEW FUNCTION; DEPRESS THE TRANSMIT (RETURN OR ENTER) KEY

ENTER 3 TO STOP; DEPRESS THE TRANSMIT (RETURN OR ENTER) KEY

3

FIGURE A-2. SAMPLE NATURAL (COMMAND) LANGUAGE

WELCOME TO

DEFENSE NUCLEAR AGENCY

LIBRARY SYSTEM

REFSUB SHORT

REFERENCE SUBSYSTEM

EXTRACT FOR FILE = BOTH,AUTH = HAMILTON, DENNIS E.

3 ITEMS FOUND

LIST ITEM, DATE, TITLE, ACCESS

ITEM	DATE	TITLE	ACCESSION #
1	1976	ANCIENT WASHINGTON; 200 YEARS OF COMPUTER EXCELLENCE	DTL-1234578
2	1983	WASHINGTON D.C.; DEVELOPMENT OF THE SUPER DUPER THINKING COMPUTER	DTL-34567
3	1984	WALKING, TALKING, THINKING COMPUTERS OF THE FUTURE	ADB65327

STOP

APPENDIX B

LOCAL AUTOMATION MODEL

SAMPLE REPORT FORMATS

This appendix contains preliminary sample reports depicting catagories of information that will be obtainable in a LAM. These reports and others that are necessary for a SBIN library manager will be designed into the LAM. Although a considerable amount of analysis has been conducted to support these report formats, revisions and additional report formats will be presented in the functional description and system/subsystem specification.

The categories of report types are as follows:

- Monthly Statistical Report
- Monthly Downgrade Report
- Report/Document Number Report
- Subject Heading Index.

REPORT LAYOUT EXPLANATION SHEET NO. 1

1. Report Title: Monthly Statistical Report

2. Purpose of Report: To tabulate library statistics for major library functions

3. Sequencing of Information: This report will be sequenced by library function

4. Heading: Includes security classification of the report, name of the LAM agency library and name of report

5. Body of the Report:

   a. Within major library functions, statistics are generated for the current month, previous month and year to date (where applicable).

   b. Statistics within each function (circulation, holdings, etc.) are tabulated by one or more characteristics, as follows:

      - Circulation statistics reflect the number of holdings which have been checked out of the library, tabulated by: media of the holding, security classification of the holding, catagory of patron, and number of days elapsed since the document was checked out

      - Holdings statistics reflect the number of documents in a library's collection, tabulated by media and security classification

      - Acquisitions statistics refer to the number of documents which were recently procured by the library tabulated by media and security classification

      - SBIN statistics refer to the number of records transmitted via the Shared Bibliographic Input Netwrok to DTIC

      - Certified destruction statistics refer to the number of classified documents which were destroyed, tabulated by security classification of the document.

CLASSIFICATION
HEADQUARTERS DEFENSE NUCLEAR AGENCY
TECHNICAL LIBRARY

MONTHLY STATISTICAL REPORT

CIRCULATION:	CURRENT MONTH	PREVIOUS MONTH	YEAR TO DATE
BY MEDIA			
REPORTS	9999	9999	99999
PERIODICALS			
BOOKS			
MICROFICHE			
MEMORANDA			
OTHER			
TOTAL	99999	99999	999999
BY CLASSIFICATION			
TOP SECRET	9999	9999	99999
SECRET			
CONFIDENTIAL			
UNCLASSIFIED			
TOTAL	99999	99999	999999
BY PATRON			
DNA STAFF	9999	9999	99999
DNA CONTRACTOR			
DNA-ALBEQUERQUE			
DNA-SANTA BARBARA			
OTHER			
TOTAL	99999	99999	999999
BY CALENDAR DAYS			
0-14 DAYS	9999	9999	99999
15-30 DAYS			
31-60 DAYS			
61-120 DAYS			
OVER 120 DAYS			
TOTAL	99999	99999	999999
HOLDINGS:			
BY MEDIA			
REPORTS	9999	9999	
PERIODICAL			
BOOKS			N/A
MICROFICHE			
MEMORANDA			
OTHER			
TOTAL	99999	99999	

CLASSIFICATION

MONTHLY STATISTICAL REPORT

HOLDINGS: (CONTINUED)	CURRENT MONTH	PREVIOUS MONTH	YEAR TO DATE
BY CLASSIFICATION			
TOP SECRET	9999	9999	99999
SECRET			
CONFIDENTIAL			
UNCLASSIFIED	99999	99999	999999
TOTAL			
ACQUISITIONS:			
BY MEDIA			
REPORTS	9999	9999	99999
PERIODICALS			
BOOKS			
MICROFICHE			
MICROFILM			
OTHER			
TOTAL	99999	99999	999999
BY CLASSIFICATION			
TOP SECRET	9999	9999	99999
SECRET			
CONFIDENTIAL			
UNCLASSIFIED			
TOTAL	99999	99999	999999
SDIN:			
RECORDS TRANSMITTED TO:			
DTIC	9999	9999	99999
BRANCH LIBRARY			
OTHER SDIN LIBRARIES	9999	9999	99999
CERTIFIED DESTRUCTION:			
BY CLASSIFICATION			
TOP SECRET	9999	9999	99999
SECRET			
CONFIDENTIAL			
UNCLASSIFIED			
TOTAL	99999	99999	999999

CLASSIFICATION

REPORT LAYOUT EXPLANATION SHEET NO. 2

1. Report Title: Monthly Downgrade Report

2. Purpose of Report: To identify documents scheduled for downgrading each month

3. Sequencing of Information: This report will be sequenced by security classification and, secondarily, by accession number

4. Heading: Includes security classification of the report, name of the LAM library, report title, date on which the report was generated, and page number

5. Body of the Report:

The body is divided into two parts:

a. Statistical summary:

- Current classification: Security classification of the library headings

- Previous month: The number of holdings, scheduled for downgrading in previous months, which were not downgraded

- Current month: The number of holdings scheduled for downgrading in the current month

- Next Month: The number of holdings scheduled for downgrading in the following month

b. Detailed listings; includes the following information on all holdings currently due for downgrading:

- Accession number: Call number assigned to a document, from the classification scheme used by an individual library in cataloging its holdings

- Status: Indicates whether a holding is currently on-hand or unavailable (checked out, being rebound, etc)

- Title: The name of the document, including the subtitle and alternate where cited

- Copy number: Number assigned to multi-copy holdings to uniquely identify each copy

- Downgrade classification: Security classification to which a holding is scheduled to be re-classified

- Downgrade date: Date on which a holding is scheduled to be re-classified.

CLASSIFICATION

HEADQUARTERS DEFENSE NUCLEAR AGENCY

TECHNICAL LIBRARY

MONTHLY DOWNGRADE REPORT

AS OF: XXXXXX PAGE: 99

NUMBER OF HOLDINGS TO BE DOWNGRADED

CURRENT CLASSIFICATION	PREVIOUS MONTHS	CURRENT MONTH	NEXT MONTH
TOP SECRET	999	999	999
SECRET	999	999	999
CONFIDENTIAL	999	999	999
TOTAL	9999	9999	9999

CONFIDENTIAL HOLDINGS TO BE DOWNGRADED THIS MONTH
(INCLUDING HOLDINGS NOT DOWNGRADED IN PREVIOUS MONTHS)*

ACCESSION NUMBER	STATUS	TITLE	COPY NO	DOWNGRADE CLASSIFICATION	DOWNGRADE DATE
99999	X	XXXXXXXXXXX	999	XXXXXX	XXXXXX
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

*NOTE: THIS REPORT WILL BE SORTED BY ALL SECURITY CLASSIFICATIONS WITHIN A LIBRARY'S COLLECTION (i.e., TOP SECRET, SECRET, CONFIDENTIAL, ETC.)

REPORT LAYOUT EXPLANATION SHEET NO. 3

1. Report Title: Report/Document Number Index

2. Purpose of Report: To provide a hard copy or COM reference document to be used in place of the on-line reference subsystem in the event of a system failure.

3. Sequencing of Information: This report will be sequenced by report/document number. Information about each report/document will be presented on a single page.

4. Heading: Includes security classification of the report, name of the LAM library, report title, date on which report was generated, and page number.

5. Body of Report:

   a. Call number: The number assigned to a document from the classification scheme used by an individual library in cataloging its holdings.

   b. Report number (or source series): The number assigned to a document by the organization, whether government, military or contractor, which performed the research recorded in the report.

   c. Title: The name of the document, including the subtitle and alternative title when cited.

   d. Author:

      - Personal author: The person credited with the preparation, writing or compiling of the content of the report

      - Corporate author: The organization credited with the preparation, writing or composing of the content of the report

e. Document identification number

- DTIC accession number: A machine processing control number assigned uniquely to a technical report by DTIC
- Report number: Same as "B. Report Number" above
- MIPR number: Military Interdepartmental Purchase Request number
- Contract number: The contract, grant, or order funding that identifies the financial support of the research results recorded in the technical report
- Sub-task number: A component of a task representing a discrete unit of work performed by a single organization
- Monitor acronym: The acronym prefix and agency series number assigned to a technical report by the military
- Monitor series: Organization or government office monitoring or sponsoring the research in the report.

f. Security identification

- Document classification: Security classification of the document
- Document control number: Unique identification number assigned to a classified document by the security control point within an organization
- Citation classification: Security classification of the bibliographic record.

g. Document characteristics

- Media: Output format of the report (hard copy, microfiche, microfilm, etc)
- Report date: The date of publication of the document
- Volume and issue: For periodical publications, the numbers which uniquely identify a particular issue
- Weeds: Information used for reviewing and discarding unnecessary library holdings
- Pagination: Number of pages in the document
- Number of copies: Number of copies of the document in the library's catalog
- Copy numbers: Sequential numbering of documents for which a library has multiple copies.

NOTE:

Report indexes sequenced by the following fields can also be generated in this format:

- Monitor acronym/monitor series
- Subtask
- MIPR number
- Contract number
- Report title
- Personal author
- Corporate author.

CLASSIFICATION

```
                                   HEADQUARTERS DEFENSE NUCLEAR AGENCY
AS OF DATE:  XXXXXX                         TECHNICAL LIBRARY                                  PAGE:  XXXXXXX
                                          REPORT NUMBER INDEX

CALL NUMBER:   DTL-XXXXXXX

REPORT NUMBER   XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TITLE:      XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
            X                                                                                             X
            X                          450 CHARACTERS                            XXXXXXXXXXXXXXXXXXXXXXXXXXX
            XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

PERSONAL        XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX     CORPORATE  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
     AUTHOR:    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX       AUTHOR:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                                                                                 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

                                      (MAY REPEAT UP TO 5 TIMES)

DOCUMENT IDENTIFICATION NUMBERS:
DTIC ACCESSION #:  XXXXXXXXX                     REPORT #:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MIPR #:  XXXXXX            CONTRACT #:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX                SUBTASK #:  XXXXXXXXXX

MONITOR ACRONYM:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MONITOR SERIES:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (MAY REPEAT 2 TIMES)

SECURITY IDENTIFICATION:
DOCUMENT CLASSIFICATION:  XXXXXXXXXXXXXXXXXXXX    DOCUMENT CONTROL #:  XXXXXX    CITATION CLASSIFICATION:  XXXXXXXXXXXXXXXXXXXX

DOCUMENT CHARACTERISTICS:
      MEDIA:  XXXXXXXXXX                          VOLUME:  9999                               WEEDS:  X-XX-XXXX
      REPORT DATE:  XXXXXX                        ISSUE:  9999                                PAGINATION:  9999
      NUMBER OF COPIES:  9999    COPY NUMBERS:  XXXX  XXXX  XXXX  XXXX  XXXX  XXXX  XXXX  XXXX
```

CLASSIFICATION

REPORT LAYOUT EXPLANATION SHEEET NO. 4

1. Report Title: Subject Heading Index
2. Purpose of Report: To provide a hard-copy reference document in place of the on-line catalog in the event the system is not available.
3. Sequencing of Information: This report will be sequenced alphabetically by subject heading.
4. Heading: Includes security classification of the report, name of the LAM library, report title, date on which the report is generated
5. Body of the Report:
   a. Subject heading: Any single word on phrases expressing the technical effort being reported.
   b. Library accession number: A list of documents, identified and sorted by library accession number, which are cataloged under the given subject heading.

CLASSIFICATION

HEADQUARTERS DEFENSE NUCLEAR AGENCY

TECHNICAL LIBRARY

SUBJECT HEADING INDEX

AS OF DATE: MMDDYY PAGE: 999

SUBJECT HEADING: XXXXX XXX

DNA ACCESSION NO: DTL - 99,9999

DTL - 99,9999

DTL - 99,9999

DTL - 99,9999

SUBJECT HEADING: XXXXX XXXXX

DNA ACCESSION NO: DTL - 99,9999

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DTL - 99,9999

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